

JAPAN

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JIS B 6607 (1983) (English): Safety standards for construction of band saw machines with feed carriages

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*The citizens of a nation must
honor the laws of the land.*

Fukuzawa Yukichi

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UDC 621.935 : 62-78

JAPANESE INDUSTRIAL STANDARD

**Safety Standards for Construction
of Band Saw Machines
with Feed Carriages**

JIS B 6607—1983

Translated and Published

by

Japanese Standards Association

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standard in Japanese is to be evidence

JAPANESE INDUSTRIAL STANDARD

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Safety Standards for Construction of Band Saw
Machines with Feed Carriages

B 6607-1983

1. Scope

This Japanese Industrial Standard specifies the safety construction, safety devices, instruction manuals, inspection cards and markings for band saw machines with feed carriages(¹), hereinafter referred to as the "band saw machine".

Note (¹) Refer to JIS B 0114.

2. Definitions

For the purposes of this Japanese Industrial Standard, the following definitions apply.

- (1) driving saw wheel Out of the two saw wheels constituting the band saw machine, that saw wheel which is driven by an electric motor.
- (2) cutting side Out of the straight line portions of a band saw which has been tensioned by the two saw wheels constituting the band saw machine, that side which cuts the work piece.
- (3) suppressing device That device which suppresses the lateral deflection of the band saw. This is composed of suppressing rods, suppressing-rod holder, suppressing arm and others.
- (4) tensioning force A tensile force given to the band saw through the two saw wheels constituting the band saw machine.
- (5) pocket That space formed between the frame which supports the upper saw wheel and the straight line part of the cutting side of the band saw.
- (6) on board driving system feed carriage The feed carriage of that system of which travelling operations are carried out on board.

Applicable Standards:

JIS B 0114-Glossary of Terms for Wood Working Machinery

JIS G 3101-Rolled Steel for General Structure

JIS G 4051-Carbon Steels for Machine Structural Use

JIS G 5501-Gray Iron Castings

Reference Standards:

JIS B 6507-General Code of Safety for Wood Working Machinery

JIS B 6509-Test Code for Performance and Accuracy of Band Saw
Machines and Feed Carriages

- (7) neutral position The position of an operating lever at which position of the feed carriage is not actuated in both directions of advance and retreat.

3. Safety Construction

3.1 Starting Switch The starting switch (this means the switch for starting and breaking of the power.) shall be in accordance with the following:

- (1) The starting switch shall be equipped on a position from which the worker can operate it without leaving the working position.
Furthermore, as far as the starting of the band saw machine body is concerned, the switch shall be that of capable of confirming, irrespective of the working position, the conditions of the band saw, as well as capable of operating at a position from which it can be adjusted.
- (2) The starting switch shall be that of capable of being operated easily, as well as not liable to be worked unexpectedly due to contact, vibration and others.

3.2 Restart Preventing Device The band saw machine shall be equipped with the device which automatically maintains the condition of "off" at time of service interruption or in the case where the electric source for driving has been made "off", and which after the restoration from service interruption or in the case where the electric source for driving has been made "on", automatically prevents the band saw machine body and feed carriage from restarting.

3.3 Saw Wheel The saw wheel shall be in accordance with the following:

- (1) The saw wheel shall be that having sufficient strength against working forces such as the tensioning force due to the band saw, centrifugal force and braking force.
- (2) The material of the driving saw wheel shall be FC 20 of JIS G 5501, or that having mechanical properties equal or superior to this.
- (3) The material of the saw-wheel shaft shall be S 45 C of JIS G 4051, or that having mechanical properties equal or superior to this.

3.4 Braking Device of Driving Saw Wheel The braking device of the driving saw wheel shall be in accordance with the following.

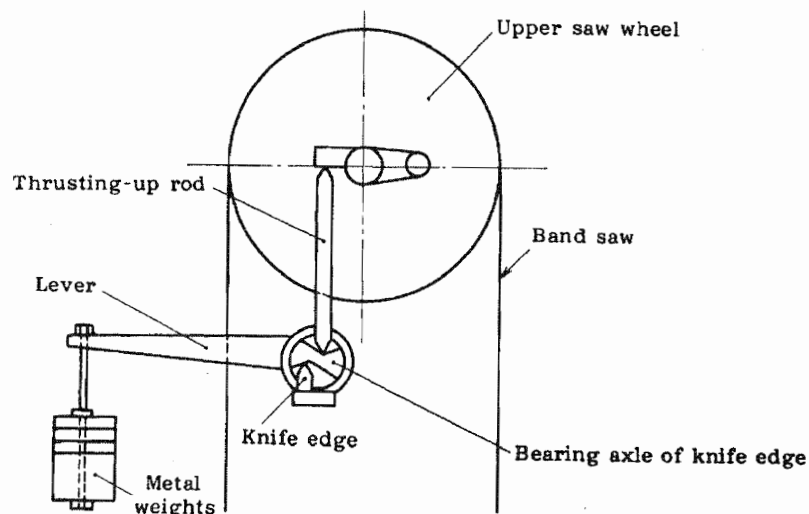
- (1) The driving saw wheel shall be equipped with the braking device which is capable of braking its motion effectively.
- (2) The braking device shall be that of capable of being operated easily, and be so constructed as to be capable of being adjusted so that its function always works sufficiently.
- (3) The braking device of which operating mechanism is of manual or treading shall conform to respective items of the following.

- (a) The operating direction shall be towards non cutting side.
- (b) In order to prevent tumbling down, falling down and the like, handles shall be provided.
- (c) The treading pedal shall be treated with non-skid process on its surface, and be provided with the stopper which prevents the pedal from descending down to the lower position than the horizontal.

3.5 Band-Saw Tensioning Device The band-saw tensioning device shall be in accordance with the following (see Fig. 1).

- (1) The mechanism of the device shall be such that the band saw always maintains reasonable tensioning force corresponding to saw widths, saw thicknesses, cutting conditions and others, as well as works with suitable sensibility.
- (2) In order to maintain the reasonable tensioning force given in (1) at all times, the device is desirable to provide such a mechanism, if any abnormal tensioning force has been caused due to some reasons, which makes the band saw machine body stop starting, and for that of during running, which emits alarms, or which operates the braking device automatically by breaking the power.
- (3) The material of the thrusting-up rod, bearing axle of knife edge and knife edge for the lever type band-saw tensioning device shall be S 45 C of JIS G 4051 or that having mechanical properties equal or superior to this, and any hardening treatment shall be processed on required portions for enhancing abrasion resistance.
- (4) It is desirable either to install a tensioning device having a function to prevent any abnormal running behavior such as dislocation of band saw out of the saw wheel and the like, or to provide such a mechanism which emits alarm with detecting its behavior or a mechanism which breaks the power immediately to actuate the breaking device automatically.

Fig. 1. Band Saw Tensioning Device



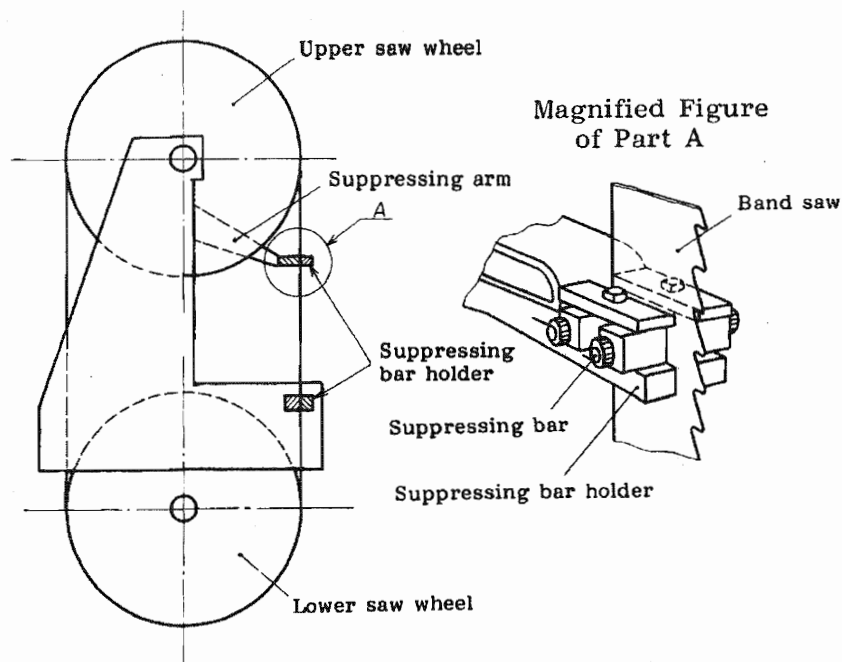
Remark: The figure gives an example, and this does not specify the construction.

3.6 Inclining Device of Upper Saw Wheel The inclining device of the upper saw wheel shall be of mechanism so as not to change the inclination of saw wheel, even if any unexpected force is applied to the operating handle, during running.

3.7 Suppressing Device The suppressing device shall be in accordance with the following (see Fig. 2).

- (1) The suppressing bar shall be such that of which fixing position can be adjusted easily according to saw width.
- (2) The ascending and descending operation of the suppressing arm shall be that of capable of carrying out at any position where no liability of contact with the saw-teeth is expected.
- (3) The upper suppressing bar holder shall be that of capable of descending down to the position until the distance between its lower end and the workpiece becomes as smaller as possible.

Fig. 2. Suppressing Device



Remark: The figure gives an example, and this does not specify the construction.

3.8 Adherent Substance Eliminating Devices of Saw Wheel and Band Saw The band saw machine shall be equipped with the adherent substance eliminating plates which eliminate saw dusts, resin and the like adhering to the saw wheel and band saw, and the eliminating device for the oiling device and the like.

Furthermore, the adherent substance eliminating device shall not be that of liable to inflict any damage on the saw wheel and band saw.

3.9 Roll-in Preventing Device for Chips and Others of Lower Saw Wheel

The roll-in preventing device shall be equipped on such a place as liable to roll-in chips, barks and others between the lower saw wheel and the band saw.

Furthermore, for the part of the roll-in preventing device which is adjacent to the band saw, any material which is not liable to inflict damage on the band wheel shall be used, and it shall be that of interchangeable easily.

3.10 Head Stock The head stock shall be in accordance with the following:

- (1) For the advancing or retreating motion of a head stock, an overrun preventing device shall be equipped.
- (2) Regarding the manual system taper-set device, it shall be so constructed that the taper-set lever is not liable to fall down suddenly due to dislocation of the claw from the groove of the taper-set fan plate.

3.11 Manual System Running Device The manual system running device shall be in accordance with the following.

- (1) The material for the claw and tooth portion of claw wheel of the manual system running device shall be S 45 C of JIS G 4051 or that having the mechanical properties equal or superior to this, and the tip end of the claw and tooth portions of claw wheel shall be processed with hardening treatment for enhancing abrasion resistance.
- (2) The claw lifting device of the manual system running device, when the claw lifting lever has been operated, it shall be so constructed that the clearance between the tip end of each feed claw and the tip end of the tooth of the claw wheel is maintained at 3 mm or over, as well as it shall be interlocked with the rapid opening and closing device of the head stock.

3.12 Clamping Device The clamping device shall be in accordance with the following:

- (1) The clamping device shall be so constructed that it holds the workpiece securely and is capable of reinforced-clamping.
- (2) The material of the clamp shall be SS 41 of JIS G 3101 or that having mechanical properties equal or superior to this, and the tip ends shall be processed with hardening treatment for enhancing abrasion resistance.
- (3) The lower clamp shall either be so constructed that it does not protrude to the band saw side from the upper clamp, or that it does not protrude by 5 mm or over from the tip end of the head block. For the manual system clamping device, however, it may be so constructed as to be capable of confirming the protruded amount of the lower clamp.

3.13 Off-set Device The off-set device shall be in accordance with the following:

- (1) It shall be that of working securely corresponding to the advance and retreat of the feed carriage, as well as an off-set amount adjusting function shall be provided on each off-set device.
- (2) Corresponding to the advance and retreat of the feed carriage, it shall be so constructed that the work is to be finished within 300 mm of its travelling distance.
- (3) It shall be that of 9 mm or over in the minimum off-set amount.
- (4) The feed carriage shall be equipped with off-set devices at 2 places or over. At least on the wheel axle of the front end and rear end (excluding the auxiliary carriage.), these shall be equipped without fail.

3.14 Feed Carriage Travelling Device The device which allows to travel the feed carriage by winding wire rope on a drum shall be in accordance with the following:

- (1) The value of the ratio of the pitch circle diameter of the drum to the wire rope diameter being wound on the drum concerned, and the value of the ratio of the pitch circle diameter of the sheave to the diameter of wire rope passing through the sheave shall be 16 or over.
- (2) The angle included between the direction of the wire rope being wound and the groove of the grooved drum shall be 4 deg or under.
- (3) The wound angle between the wire rope and the sheave shall be 2 deg or under.
- (4) The connection of the wire rope with the drum, hook block, etc. shall be carried out by such methods as an alloy packed socket fixing, clamp fixing, cotter fixing and clip fixing which are capable of jointing rigidly.
- (5) The attaching part of the wire rope shall be equipped with a tension adjusting device by which the wire rope is tensioned appropriately.
- (6) The wire rope shall be in accordance with the following:
 - (a) The safety factor of the wire rope (a divided value of the value of breaking load of a wire rope by the maximum value of the load to be applied to the wire rope concerned) shall be 5 or over.
 - (b) The extra winding of the wire rope shall be such that, for a type in which the wire is fixed at every one end to the drums respectively, 2 winds or over is to be left on the drum even the feed carriage is at the farthest position, and for that type in which the wire rope is driven by friction, 6 winds or over shall be left on the drum.

3.15 Operation Lever for Travel of Feed Carriage The operating direction of the operation lever for travel of feed carriage, hereinafter referred to as the "operation lever", shall be the same as the travelling direction of the feed carriage, and be corresponding to either one of the following items. However, it is desirable to be in accordance with (2) or (3).

- (1) When the operation lever is released from hand after being returned to the neutral position, the lever is to be locked automatically, as well as so constructed as can be so confirmed, and not liable to be worked unexpectedly by such external forces as vibration and contact.
- (2) When the operation lever is released from hand, the lever shall be so constructed as to restore its neutral position automatically and be locked, and not liable to be worked unexpectedly by such external forces as vibration and contact.
- (3) When the operation lever is released from hand, it shall be so constructed that the motor for travelling stops.

3.16 Mounting Device of Portable Electric Wire The feed carriage which mounts the portable electric wire shall be equipped with the mounting device of portable electric wire for preventing the portable electric wire from being tensioned, twisted and the like in a remarkable degree.

3.17 Floor and Others of Places Where Feed Carriage is Operated The floor and other of places where feed carriage is operated shall be in accordance with the following:

- (1) The place where the on board driving system feed carriage is to be operated shall be provided with a working floor which is free from stumbling, slippage and the like, as well as be provided with handles or gripping bars.
- (2) A feed carriage on which an operator, who operates the running device, clamping device, and others, gets on shall be provided with a working floor which is free from stumbling, slippage and the like, as well as be provided with the hand rail or gripping bar for falling-down prevention on suitable places.

3.18 Obstacle Eliminating Device on Track The obstacle eliminating device on track shall be in accordance with the following:

- (1) An obstacle eliminating device for eliminating the obstacle on the track shall be equipped at the front end and rear end of the feed carriage.
- (2) The obstacle eliminating device given above shall be that of which distance between its lower end and rail surface becomes 6 mm or under.

3.19 Adherent Substance Eliminating Device on Wheels and Rails The feed carriage shall be equipped with the adherent substance eliminating device for eliminating saw chips, barks, etc. which adhere to the contact face of the wheels and rails.

3.20 Runaway Stopping Device of Feed Carriage In the both ends of the travelling road of the feed carriage, the runaway stopping device for preventing shall be provided.

4. Safety Device

4.1 Saw-Teeth Cover The saw-teeth cover, excluding the portion necessary for cutting of the workpiece, shall be so constructed that it can cover the saw-teeth.

Furthermore, the saw-teeth cover of the cutting side of the workpiece, hereinafter referred to as the "contact preventing device", shall be in accordance with the following:

- (1) The material shall be the steel plate of 1 mm or over in thickness or that having the strength equal or superior to this.
- (2) The contact preventing device shall be the integral construction with the suppressing bar holder, and of which ascending and descending operation shall be that of capable of being operated mechanically.
- (3) The contact preventing device shall cover 3 faces except the pocket side, and of which front side shall be that of capable of being opened and closed.
- (4) The contact preventing device, even if the suppressing bar holder has been lowered down to the lowest limit position, shall be such that the saw-teeth are not exposed to the space between its upper end and the lower end of the upper saw-wheel cover.
- (5) The device shall be so constructed that the front view is not disturbed remarkably.

4.2 Saw Wheel Cover The saw wheel cover shall be in accordance with the following:

- (1) The material shall be the steel plate of 1 mm or over in thickness or that having the strength equal or superior to this.
- (2) The cover shall be that of covering the upper face and the front, rear, left and right faces of the saw wheel.

Furthermore, the upper saw-wheel cover, even if the saw wheel has been lowered down to the lowest limit position, shall be such that the lower end of the saw wheel is covered with it.

- (3) The material of the lower saw-wheel cover which covers the pit too shall be the steel plate of 3 mm or over in thickness, or that having the strength equal or superior to this.
- (4) The upper saw wheel cover shall be processed with lining, using an effective shock absorbing material, for preventing flying out of band saw and fragments due to the breakage of the band saw.
- (5) The interval between the upper end at the highest position of the upper saw wheel and the surface of the lining of the cover shall be 100 mm or over.
- (6) The upper saw-wheel cover shall be equipped with the saw receiver for receiving the band saw which has been dislocated out of the saw wheel, at an appropriate place of the saw-teeth side of the inner face.
- (7) On the upper saw-wheel cover, a telltale window for confirming the relative position between the saw wheel and the band saw may be equipped. In this case, however, it shall be that of capable of maintaining the strength of the opening part sufficiently.

4.3 Automatic Alarm Device and Feed-Carriage Automatic Stopping Device for Entrance in Dangerous Region In case of entrance of workers in dangerous region, the automatic alarm device which gives warning to the travelling operator of the feed carriage or the automatic stopping device of feed carriage shall be equipped.

5. Instruction Manual

The band-saw machine shall be appended with the instruction manual in which necessary matters for securing safety such as the type, specifications, construction, band saw to be used, operation, maintenance, inspection, adjustments, installation and other matters to be attended on safety are stated.

6. Inspection Card

The band saw machine shall be appended with the inspection card (inspection items and results thereof) relating to safety.

7. Marking

The band saw machine shall be marked with the following information on a conspicuous place by an indelible way.

- (1) Manufacturer's name
- (2) Year and month of manufacture and serial number
- (3) Type

- (4) Rated output or rated current
- (5) Rated voltage
- (6) No-load speed of rotation
- (7) Tensioning magnification
- (8) Mass of standard metal weights and standard oil pressure (the mass of standard metal weights and standard oil pressure imparting an adequate tensioning force to the band saw, according to saw widths, saw thickness and others)
- (9) Maximum travelling speed
- (10) Effective opening of head block
- (11) Effective opening of clamp
- (12) Maximum laden dimensions [length x height (diameter) of workpiece]
- (13) Maximum laden load
- (14) Mass of feed carriage
- (15) Other necessary matters particularly on safety

B 6607-1983
Edition 1

Japanese Text

Established by Minister of International Trade and Industry

Date of Establishment: 1983-08-01

Date of Public Notice in Official Gazette: 1983-08-04

Investigated by: Japanese Industrial Standards Committee

Divisional Council on Machine Tools

Technical Committee on Woodworking Machines

This English translation is published by:
Japanese Standards Association
1-24, Akasaka 4, Minato-ku,
Tokyo 107 Japan

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Printed in Tokyo by
Hohbunsha Co., Ltd.